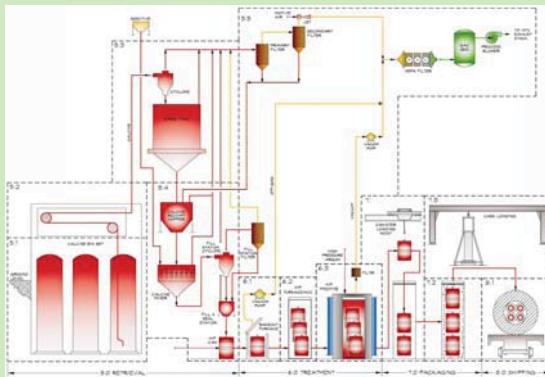


# Technology Readiness Assessment Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

## Preliminary TRA of the Calcine Disposition Project

### Why DOE-EM Did This Review



Calcine HIP Treatment Process Flow Diagram

The Idaho high-level waste calcine is solid granular material designated through an amended ROD (issued Dec. 2009) to undergo treatment by a Hot Isostatic Press (HIP) process. The HIP process, possibly with additives, converts the calcine to a monolithic waste form with durability and leach rates comparable to those of borosilicate glass. The calcine disposition project is currently in the conceptual design phase and anticipates Critical Decision-1 (CD-1) approval in late 2012 authorizing the preliminary design phase. For CD-1 approval, it is typically recommended that the selected technology be at a Technology Readiness Level (TRL) of 4 or higher. The objective of this assessment was to identify the Critical Technology Elements (CTEs) of the HIP treatment process and assign the TRLs that are anticipated by late 2010 in preparation for CD-1.

### What the TRA Team Found

The assessment team identified the eleven CTEs listed below along with the associated TRLs expected to be achieved prior to CD-1 (now scheduled for 2012):

- Retrieval/Pneumatic Transfer System (TRL=4)
- Batching and Mixing System (TRL=4)
- Ceramic Additive Formulation (TRL=3)

- Hot Isostatic Pressing Can Design (TRL=3)
- Hot Isostatic Pressing Can Containment (TRL=2)
- HIP Can Filling and Closure (TRL=4)
- Bakeout System (TRL=4)
- Canister loading/Closure (TRL=4)
- Remote Operation and Maintenance (TRL=4)
- Characterization: feed, admixture, product (TRL=4)
- Simulant Formulation (TRL=3)

The team identified several significant project risks, among which were the following:

- Design of the facility is being restricted to the Integrated Waste Treatment Unit (IWTU) footprint for systems requiring Performance Class-3 construction; meeting this requirement and the December 2035 completion date will be a challenge.
- If additional sampling of calcine is required, designing and constructing the facility within the IWTU footprint may be impractical.

Significant supporting documentation was not available to the assessment team at the time of the review. A follow-up assessment will be required prior to CD-1.

### What the TRA Team Recommended

- The project should ensure that all required documents be complete and available to the review team for all future assessments.
- The project should complete discussions of waste form requirements with the EPA and EM as soon as possible.
- A full-scale mockup facility should be built and operated to achieve a TRL of 6 for CD-2.
- The project's technology maturity plan should identify all necessary development work and address achieving a TRL of 6 for all CTEs prior to CD-2.

To view the full TRA reports, please visit this web site:  
<http://www.em.doe.gov/Pages/ExternalTechReviews.aspx>

TRA Summary: August 2011

*The objective of a Technology Readiness Assessment (TRA) is to determine the maturity of certain key technologies, identified as Critical Technology Elements (CTEs), using a systematic, metric-based process and to evaluate the readiness of these technologies for insertion into a project design.*



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